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CLAIMS

What is claimed is:

1. A imaging system, comprising:

a non-destructive optical device that obtains information concerning a target object; and

an X-Y positioning system adapted to position one or both of the target object and the optical device to multiple pre-determined locations with movements smaller than the obtainable lateral resolution of the optical device.

2. The system of claim 1 wherein the non-destructive optical device comprises an interferometer.

3. The system of claim 1 wherein the non-destructive optical device comprises a microscope.

4. The system of claim 1 wherein the positioning system comprises a positioning system with nanometer-precision or better.

5. The system of claim 1 wherein the positioning system positions with movements selected from the group consisting of rotation in the horizontal plane, rotation in the vertical plane, tilting in the horizontal plane, tilting in the vertical plane, and a combination thereof.

6. The system of claim 1 wherein the pre-determined locations are determined by rotating the target object.

7. The system of claim 1 wherein the pre-determined locations are determined by selecting random sub-pixel locations.

8. The system of claim 1 further comprising a computer system coupled to the optical device for storing the information obtained from the non-destructive optical device.

9. The system of claim 1 wherein the positioning system comprises a first positioning system with a precision an order of magnitude better than a second position positioning system that is coupled to the first positioning system.

10. The system of claim 9 wherein the second positioning system is locked into place with a locking device selected form the group consisting of a mechanical lock, a electrical lock, or a combination of thereof.

11. A method for producing high-resolution images of a target object with a non-destructive optical device, the method comprising:

positioning one or both of the target object and the non-destructive optical device to pre-determined offset locations more closely spaced than the obtainable resolution of the optical device;

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producing a plurality of images from information generated by the optical device at the offset locations; and

combining the plurality of images to produce a single combined image.

12. The method of claim 11 further comprising stacking the images produced from the offset locations to reduce noise associated with the images.

13. The method of claim 11 further comprising deblurring the single combined image using a mathematical operations selected from the group consisting of inverse filters, deconvolution filters, direct inverse filters, Wiener filters, regularized deconvolution filters, blind deconvolution filters, Wavelet-based inverse filters, and combinations thereof.

14. A non-destructive optical imaging system, comprising:

a means for obtaining information describing a target object with electromagnetic radiation;

a means for positioning the target object and/or imaging system to pre-determined offset locations smaller than the obtainable resolution of the information; and

a means for generating images from the information; and

a means for combing the generated images into a single combined image.

15. The non-destructive optical imaging system of claim 15 further comprising a means for deblurring the single combined image.

16. A method for producing images of a target object with a optical device, the method comprising:

positioning one or both of the target object and the optical device to pre-determined offset locations more closely spaced than the obtainable resolution of the optical device;

producing a plurality of images at each offset location from information generated by the optical device;

stacking the plurality of images producing at each offset location to remove noise; and

combining the stacked images into a single combined image with a pixel spacing less than the pixel spacing of the pixel spacing of the plurality of images producing at each offset location.

17. The method of claim 16 further comprising deblurring the single combined image using a mathematical operations selected from the group consisting of inverse filters, deconvolution filters, direct inverse filters, Wiener filters, regularized deconvolution filters, blind deconvolution filters, Wavelet-based inverse filters, and combinations thereof.

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18. The method of claim 16 wherein the optical device is selected from the group consisting of a microscope and an interferometer.